

CLAIMS:

1. A method of forming a material adjacent a conductive electrical component comprising the following steps:

providing the conductive electrical component over a substrate;
spinning a liquid onto the substrate and adjacent the conductive electrical component;

at least partially curing the liquid into a substantially self-supporting mass; and

at least partially vaporizing the mass.

2. The method of claim 1 wherein the mass comprises polyimide or photoresist and wherein the polyimide or photoresist is at least partially vaporized.

3. The method of claim 1 wherein the mass comprises a solvent after at least partially curing the liquid and wherein the solvent is removed from the mass as the mass is at least partially vaporized.

1 4. The method of claim 1 wherein the mass comprises two
2 solvents as the liquid is spun onto the substrate, one of the solvents
3 being more volatile than the other, wherein said more volatile solvent
4 substantially evaporates before the mass is at least partially vaporized,
5 wherein said other solvent substantially remains in the mass until the
6 mass is at least partially vaporized, and wherein said other solvent is
7 removed from the mass as the mass is at least partially vaporized.
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9 5. The method of claim 1 wherein the mass is substantially
10 totally vaporized.
11

12 6. The method of claim 1 further comprising forming a layer
13 over the mass before at least partially vaporizing the mass.
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15 7. The method of claim 1 wherein the mass is only partially
16 vaporized to leave a matrix adjacent the conductive electrical component,
17 the matrix having at least one void within it.
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19 8. The method of claim 7 further comprising forming a layer
20 over the matrix after partially vaporizing the mass.
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1 9. A method of forming a material adjacent a conductive
2 electrical component comprising the following steps:

3 providing a mass adjacent the conductive electrical component, the
4 mass comprising pores, the pores having a size; and
5 expanding the size of the pores.
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7 10. The method of claim 9 wherein the pores are expanded by
8 vaporizing the mass.
9

10 11. The method of claim 9 wherein the mass comprises a first
11 material and a second material and wherein the pores are expanded by
12 substantially totally vaporizing the first material while not totally
13 vaporizing the second material.
14

15 12. A method of forming a material adjacent a conductive
16 electrical component comprising the following steps:

17 providing a mass adjacent the conductive electrical component; and
18 partially vaporizing the mass to form a matrix adjacent the
19 conductive electrical component, the matrix having at least one void
20 within it.
21

22 13. The method of claim 12 wherein the mass comprises a first
23 material and wherein the partial vaporization of the mass comprises
24 partially vaporizing the first material.

14. The method of claim 12 wherein the mass comprises a first material and a second material and wherein the partial vaporization of the mass comprises substantially totally vaporizing the first material while not totally vaporizing the second material.

15. The method of claim 12 further comprising forming a layer over the mass before partially vaporizing the mass.

16. The method of claim 12 further comprising forming a layer over the matrix after partially vaporizing the mass.

17. The method of claim 12 further comprising:
before partially vaporizing the mass, anisotropically etching the mass to form a spacer from the mass adjacent the conductive electrical component.

18. A method of forming a material adjacent a conductive electrical component comprising the following steps:

providing a mass adjacent the conductive electrical component, the mass comprising polyimide or photoresist; and

at least partially vaporizing the mass.

1 19. The method of claim 18 wherein the conductive electrical
2 component is over a substrate and wherein the step of providing the
3 mass comprises spinning the mass over the substrate.

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5 20. The method of claim 18 wherein the mass is substantially
6 totally vaporized.

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8 21. The method of claim 18 further comprising forming a layer
9 over the mass before at least partially vaporizing the mass.

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11 22. The method of claim 18 wherein the mass is only partially
12 vaporized to leave a matrix adjacent the conductive electrical component,
13 the matrix having at least one void within it.

14
15 23. The method of claim 22 further comprising forming a layer
16 over the matrix after partially vaporizing the mass.

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18 24. A method of forming an insulative spacer adjacent a
19 conductive electrical component comprising the following steps:

20 providing a mass adjacent the conductive electrical component;

21 anisotropically etching the mass; and

22 partially vaporizing the mass to form an insulative spacer adjacent
23 the conductive component, the insulative spacer comprising a web having
24 at least one void within it.

1 25. A method of forming an insulative spacer adjacent a
2 conductive electrical component comprising the following steps:

3 providing a mass adjacent the conductive electrical component;

4 anisotropically etching the mass;

5 forming a layer over the anisotropically etched mass; and

6 at least partially vaporizing the mass to form at least one void
7 between the layer and the conductive electrical component, the layer
8 and the at least one void together comprising a insulative spacer
9 adjacent the conductive electrical component.
10

11 26. The method of claim 25 wherein the mass is substantially
12 totally vaporized.
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14 27. The method of claim 25 wherein the mass is only partially
15 vaporized to leave a matrix adjacent the conductive electrical component,
16 the matrix having the at least one void within it.
17

18 28. A method of forming a material between a pair of
19 conductive electrical components comprising the following steps:

20 providing a mass between the pair of conductive electrical
21 components; and

22 partially vaporizing the mass to form a matrix between the pair
23 of conductive electrical components, the matrix having at least one void
24 within it.

1 29. The method of claim 28 wherein the conductive electrical
2 components are conductive lines.

3
4 30. The method of claim 28 further comprising forming a layer
5 over the mass before partially vaporizing the mass.

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7 31. The method of claim 28 further comprising forming a layer
8 over the matrix after partially vaporizing the mass.

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10 32. The method of claim 28 wherein the pair of conductive
11 electrical components are horizontally displaced from one another.

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13 33. The method of claim 28 wherein the pair of conductive
14 electrical components are vertically displaced from one another.

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16 34. The method of claim 28 wherein the mass extends entirely
17 from one of the pair of conductive electrical components to another of
18 the pair of conductive electrical components.

19
20 35. The method of claim 28 wherein the mass does not extend
21 entirely from one of the pair of conductive electrical components to
22 another of the pair of conductive electrical components.

1 36. The method of claim 28 further comprising:
2 before partially vaporizing the mass, anisotropically etching the
3 mass to form spacers adjacent the conductive electrical components.
4

5 37. The method of claim 28 wherein the mass comprises carbon.
6

7 38. The method of claim 28 wherein the partial vaporizing takes
8 place under selected conditions, the mass comprising a mixture of a
9 material which is substantially non-vaporizable under the selected
10 conditions and a material which is substantially vaporizable under the
11 selected conditions.
12

13 39. The method of claim 28 wherein the mass comprises a
14 mixture of carbon and silicon dioxide.
15

16 40. The method of claim 28 wherein the mass comprises a
17 mixture of carbon and SiC_x , wherein x is from about 0.2 to about 1.5.
18

19 41. The method of claim 28 wherein the mass comprises a
20 material selected from the group consisting of photoresist and polyimide.
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42. A method of forming a material between conductive electrical components comprising the following steps:

forming a mass;

forming conductive electrical components within the mass and separated by an expanse of the mass; and

partially vaporizing the expanse of the mass to form a matrix between the pair of conductive electrical components, the matrix having at least one void within it.

43. The method of claim 42 wherein the conductive electrical components are conductive lines.

44. The method of claim 42 further comprising forming a layer over the mass before partially vaporizing the mass.

45. The method of claim 42 further comprising forming a layer over the matrix after partially vaporizing the mass.

46. The method of claim 42 wherein the mass comprises carbon.

1 47. The method of claim 42 wherein the partial vaporizing takes
2 place under selected conditions, the mass comprising a mixture of a
3 material which is substantially non-vaporizable under the selected
4 conditions and a material which is substantially vaporizable under the
5 selected conditions.

6
7 48. The method of claim 42 wherein the mass comprises a
8 mixture of carbon and silicon dioxide.

9
10 49. The method of claim 42 wherein the mass comprises a
11 mixture of carbon and SiC_x , wherein x is from about 0.2 to about 1.5.

12
13 50. The method of claim 42 wherein the mass comprises a
14 material selected from the group consisting of photoresist and polyimide.
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51. A method of forming a material between a pair of
conductive electrical components comprising the following steps:

forming at least one support member between the pair of
conductive electrical components, the support member not comprising a
conductive interconnect;

providing a mass between the at least one support member and
each of the pair of conductive electrical components; and

vaporizing the mass to a degree effective to form at least one
void between the support member and each of the pair of conductive
electrical components.

52. The method of claim 51 wherein the support member
comprises an insulative material.

53. The method of claim 51 wherein the vaporizing forms a
plurality of voids between the support member and each of the pair of
electrical components.

54. The method of claim 51 wherein the support member
comprises a conductive material not forming an operative conductive
part of any circuitry.

1 55. The method of claim 51 further comprising providing the
2 mass outwardly of at least one of the pair of conductive electrical
3 components.

4
5 56. The method of claim 51 further comprising forming a layer
6 over the mass before vaporizing the mass.

7
8 57. The method of claim 51 wherein the pair of conductive
9 electrical components are horizontally displaced from one another.

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11 58. The method of claim 51 wherein the pair of conductive
12 electrical components are vertically displaced from one another.

13
14 59. The method of claim 51 further comprising planarizing the
15 mass.

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17 60. The method of claim 51 wherein the mass comprises carbon.

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19 61. The method of claim 51 wherein the vaporizing takes place
20 under selected conditions, the mass comprising a mixture of a material
21 which is substantially non-vaporizable under the selected conditions and
22 a material which is substantially vaporizable under the selected
23 conditions.
24

1 62. The method of claim 51 wherein the mass comprises a
2 mixture of carbon and silicon dioxide.

3
4 63. The method of claim 51 wherein the mass comprises a
5 mixture of carbon and SiC_x , wherein x is from about 0.2 to about 1.5.

6
7 64. The method of claim 51 wherein the mass comprises a
8 material selected from the group consisting of photoresist and polyimide.

9
10 65. A method of forming a material between a pair of
11 conductive electrical components comprising the following steps:

12 forming a mass;

13 forming a pair of conductive electrical components within the mass
14 and separated by an expanse of the mass;

15 forming at least one support member within the expanse of the
16 mass, the support member not comprising a conductive interconnect; and

17 vaporizing the expanse of the mass to a degree effective to form
18 at least one void between the support member and each of the pair
19 of conductive electrical components.

20
21 66. The method of claim 65 wherein the vaporizing forms a
22 plurality of voids between the support member and each of the pair of
23 electrical components.

1 67. The method of claim 65 wherein the support member
2 comprises an insulative material.

3
4 68. The method of claim 65 wherein the support member
5 comprises a conductive material not forming an operative conductive
6 part of any circuitry.

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8 69. The method of claim 65 further comprising forming a layer
9 over the mass before vaporizing the mass.

10
11 70. The method of claim 65 wherein the mass comprises carbon.

12
13 71. The method of claim 65 wherein the vaporizing takes place
14 under selected conditions, the mass comprising a mixture of a material
15 which is substantially non-vaporizable under the selected conditions and
16 a material which is substantially vaporizable under the selected
17 conditions.

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19 72. The method of claim 65 wherein the mass comprises a
20 mixture of carbon and silicon dioxide.

21
22 73. The method of claim 65 wherein the mass comprises a
23 mixture of carbon and SiC_x , wherein x is from about 0.2 to about 1.5.
24

74. The method of claim 65 wherein the mass comprises a material selected from the group consisting of photoresist and polyimide.

75. An insulating material adjacent a conductive electrical component, the insulating material comprising a matrix and at least one void within the matrix, wherein the matrix comprises a partially vaporized material.

76. The insulating material of claim 75 comprising a plurality of voids within the matrix.

77. The insulating material of claim 75 wherein the matrix comprises partially vaporized carbon.

78. The insulating material of claim 75 wherein the partially vaporized material is selected from the group consisting of polyimide and photoresist.

79. The insulating material of claim 75 comprising a dielectric constant of less than or equal to about 2.

1 80. An insulating material between a pair of conductive electrical
2 components, the insulating material comprising a matrix and at least one
3 void within the matrix, the matrix comprising a partially vaporized
4 material.

5
6 81. The insulating material of claim 80 comprising a plurality
7 of voids within the matrix.

8
9 82. The insulating material of claim 80 comprising a dielectric
10 constant of less than or equal to about 2.

11
12 83. The insulating material of claim 80 wherein the matrix
13 comprises partially vaporized carbon.

14
15 84. The insulating material of claim 80 wherein the partially
16 vaporized material is selected from the group consisting of polyimide
17 and photoresist.

18
19 85. The insulating material of claim 80 wherein the matrix
20 comprises silicon dioxide.

21
22 86. The insulating material of claim 80 wherein the matrix
23 comprises SiC_x , and wherein x is greater than 0.
24

1 87. An insulating region between a pair of conductive electrical
2 components comprising:

3 a support member, the support member not comprising a
4 conductive interconnect; and

5 at least one void between the support member and at least one
6 of the pair of conductive electrical components.

7
8 88. The insulating region of claim 87 wherein the support
9 member is vertically displaced from one of the pair of conductive
10 electrical components and horizontally displaced from another of the pair
11 of conductive electrical components.

12
13 89. The insulating region of claim 87 comprising a dielectric
14 constant of less than or equal to about 2.

15
16 90. The insulating region of claim 87 wherein the support
17 member is vertically displaced from one of the pair of conductive
18 electrical components and horizontally displaced from another of the pair
19 of conductive electrical components, the support member being in
20 physical contact with the conductive electrical component from which it
21 is vertically displaced.

1 91. An insulating region between a pair of conductive electrical
2 components comprising:

3 a support member between the conductive electrical components,
4 the support member not comprising a conductive interconnect; and

5 at least one void between the support member and each of the
6 pair of conductive electrical components.
7

8 92. The insulating region of claim 91 further comprising a
9 matrix between the support member and at least one of the conductive
10 electrical components, at least one of the voids being within said matrix.
11

12 93. The insulating region of claim 91 wherein the matrix
13 comprises partially vaporized carbon.
14

15 94. The insulating region of claim 91 comprising a dielectric
16 constant of less than or equal to about 2.
17

18 95. The insulating region of claim 91 wherein the matrix
19 comprises a partially vaporized material selected from the group
20 consisting of polyimide and photoresist.
21

22 96. The insulating region of claim 91 wherein the matrix
23 comprises silicon dioxide.
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